

Formulation and Evaluation of Herbal Gel Shampoo

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ABSTRACT

Aim and Objective: The current study's goal is to formulate and evaluate an herbal gel shampoo.

Methods: The creation of shampoo that incorporates extracts from *Hibiscus rosa-sinensis*, *Embllica officinalis*, *Acacia concinna*, *Sapindus indica*, *Eclipta prostrata*, *Aloe barbadensi*, *Azadirachta indica*, *Lawsonia inermis* in different proportions. Evaluation of Physical appearance, pH, Determine percent of solids contents, Foaming ability and foam stability, Stability studies, and stability was performed.

Outcomes: The shampoo prepared was attractive and clear. It showed excellent cleansing, detergency, foam stability, small bubble size, and outstanding conditioning execution.

Conclusion: The prepared shampoo performed perfectly in the physicochemical evaluation. However, more work was needed to enhance its effectiveness as a product, safety, and quality.

Keywords: Herbal gel shampoo; *Lawsonia inermis*; Stability; Small bubble size; Quality.

1. Introduction

Herbal shampoos are a hair care product that is used for cleaning scalp and hair. Herbal shampoos are cosmetic preparations that, like conventional shampoos, are designed to cleanse the hair and scalp by utilizing traditional Ayurvedic herbs. They are employed to remove filth, oils, dandruff, pollutants from the environment, etc. [1-10, 13, 14]. A species of tropical hibiscus belonging to the Hibisceae tribe of the Malvaceae family is called *Hibiscus rosa-sinensis*. Other colloquial names for it include rose mallow, *Hawaiian hibiscus*, *Chinese hibiscus* [3], China rose, and shoeblack plant. Though native to Vanuatu, it is widely grown across the tropics and subtropics as a beautiful plant.

Embllica officinalis is a small to medium-sized plant that grows to a height of 1-6 meters (3+1/2–26 feet). The bark has specks. The branchlets are typically deciduous, 10–20 centimeters (4–8 inches) long and finely pubescent (not glabrous). Simple, subsessile, light green leaves that resemble pinnates are tightly clustered along branchlets. The blossoms have a yellow-green tint. *Acacia concinna* native to tropical Asia and China, *Senegalia rugata* is a prickly climbing shrub that grows in large quantities in the warm plains of central and southern India [1, 2]. It is commonly used as a raw component in shampoo and is also consumed in large quantities for its leaves and young shoots. It was utilized for hair care in Banawali pre-Harrapan periods, around 4500–4300 years ago, based on archaeo botanical data.

Sapindus indica common names for *Sapindus mukorossi* include Indian soapberry, washnut, and ritha. Chinese soapberry [2-5], is a species of tree of the Sapindaceae family. This deciduous tree may reach heights of 1,200 meters (4,000 feet) in the lower Himalayan foothills and midhills. In addition, it is indigenous to southern China [8], Taiwan, as recognized by its numerous indigenous peoples, and western coastal Karnataka, Maharashtra, and Goa in India [9].

A member of the Asteraceae family, *Eclipta prostrata* is also known by the names false daisy, yerba de tago, gunt agalagara aaku, Karisalankanni, and bhringraj. It is common in a large portion of the globe. The roots of this plant are grayish-cylinder-shaped. Stems: 0.8 m long, round, solid, purple, with fine white hairs. Presented in opposing pairs, the hairy leaves are lanceolate, serrated, and measure 2–12.5 cm in length and 5–35 mm in width. The single flower heads have white florets and are 7–8 mm (0.24–0.31 in) in diameter.

Aloe barbadensi is a genus of blooming succulent plants that has more than 650 species [6]. The species that is most well-known is *Aloe vera*, also referred to as "true aloe". This is the name given to it since it is grown as the typical source for various pharmacological uses. For comparable uses, other species—like *Aloe ferox*—are also farmed or collected in the wild. *Azadirachta indica* is a tree of the mahogany family Meliaceae, sometimes referred to as neem, margosa, nimtree, or Indian lilac [3]. It belongs to the genus *Azadirachta* and is one of two species. Although it is native to the Indian subcontinent and some regions of Southeast Asia, it has been naturalized and is cultivated in tropical and subtropical regions all over the world.

Neem oil is extracted from the plant's fruits and seeds. Sanskrit nimba is the root of the Hindustani term nim. *Lawsonia inermis*, a flowering plant and one of the only two species of the genus *Lawsonia* (the other being *Lawsonia odorata*), is frequently referred to as hina, the henna tree, the mignonette tree, and the *Egyptian privet* [4]. The species is named after the Scottish surgeon who was a personal friend of Linnaeus, Isaac Lawson.

Herbal shampoo is used for –

- Lubrication, Conditioning, Hair growth, Maintenance of hair color, and Cleaning.

For the current study, an herbal shampoo was developed utilizing suitable components such as *Hibiscus rosa-sinensis*, *Emblica officinalis*, *Acacia concinna*, *Sapindus indica*, and *Eclipta prostrata*, *Aloe barbadensi*, *Azadirachta indica*, *Lawsonia inermis* in different proportions [18, 19, 20-27].

Table 1. Plant name, Botanical name, Part use, Category

S. No.	Common name	Botanical name	Part use	Category	Plant Image
01	Hibiscus	<i>Hibiscus rosa-sinensis</i>	Flower	Conditioning agent	
02	Amla	<i>Emblica officinalis</i>	Fruit	Anti-dandruff agent	

03	Shikakai	<i>Acacia concinna</i>	Fruit Powder	Detergent	
04	Soapnut (Ritha)	<i>Sapindus indica</i>	Fruit Powder	Detergent	
05	Bhringraj	<i>Eclipta prostrata</i>	Leaves, flower	Hair growth	
06	Aloe vera	<i>Aloe barbadensi</i>	Leaf	Coolant	
07	Neem	<i>Azadirachta indica</i>	leaves	Antibacterial, anti-fungal, anti-septic	
08	Mehdi	<i>Lawsonia inermis</i>	leaf	Anti-microbial, Anti-oxidant, Wound Healing, Anti-inflammatory	
09	Agar	-	Powder	Gel formation	-

2. Materials and Methods

2.1. Materials were gathered

A variety of plant parts were selected in order to look into their potential for hair care. The majority of the necessary plant parts were acquired by Agarwal Ayurvedic Store Gwalior, and the remaining were gathered from the campus of ITM University. To be used later, these are ground into a powder and sent through filter number 100.

2.2. Process of Extraction

Hippocampus, *Sapindus indica*, *Acacia concinna*, *Rosa-Sinensis*, *Emblica officinalis*, and *Eclipta prostrata*, *Aloe barbadensi*, *Azadirachta indica*, and *Lawsonia inermis* should all be finely ground and extracted individually using cold maceration and water agitation for a full day [21, 23, 30, 31].

Table 2. Amount of ingredients

S. No.	Botanical name of plants	Part Use(g)	Water	Total Amount Use
1	<i>Hibiscus rosa-sinensis</i>	3g	100ml	50ml
2	<i>Emblica officinalis</i>	2.5g	100ml	50ml
3	<i>Acacia concinna</i>	4g	100ml	50ml
4	<i>Sapindus indica</i>	5g	100ml	50ml
5	<i>Eclipta prostrata</i>	2g	100ml	50ml
6	<i>Aloe barbadensi</i>	4ml	30ml	50ml
7	<i>Azadirachta indica</i>	3g	100ml	50ml
8	<i>Lawsonia inermis</i>	6g	100ml	50ml
Total				400ml

2.3. Formulation

- Take 60 ml on each container and heat when it will remain 50 ml cool it at normal temperature. Mix all ingredients by magnetic stirrer. Up to 30 mints
- Take 10 ml of hot water and agar mix into it.

Mix A and B by using magnetic stirrer. Herbal Gel shampoo is placed in transparent bottle.


Figure 1. Filtration of herbal extract

2.4. Evaluation of herbal Gel shampoo [25-31]

1. Appearance/visual inspection: The prepared formulation's fluidity, color, odor, clarity, and foam-producing capacity were evaluated (Figure 02 and Table 03).

2. pH measurement: A 10% v/v shampoo solution that was prepared in distilled water was tested using a calibrated pH meter (Figure 03 and Table 04).

3. Determine the mixture's solids percentage: After it was weighed, 4 grams of shampoo were added to a dry, clean evaporating dish. Shampoo and the dish were weighed. The liquid portion was allowed to drain by setting the dish containing the shampoo that was evaporating on a hot plate after the weight of the shampoo was accurately determined. The weight of the shampoo by itself (solids) was calculated after drying (Table 05 and Figure 04).

4. Dirt dispersion: Ten milliliters of distilled water were placed into a big test tube, and two drops of shampoo were added. After adding a drop of India ink, the test tube was sealed and shaken ten times. None, light, moderate, or strong ink were thought to be present in the foam.

5. Stability studies: To test the formulations' thermal stability, glass tubes containing the formulations were put in a humidity chamber with 45°C and 75% relative humidity.

Examining their appearance and bodily stability every month for three months (Table 07).

6. Determination of Foam: While foam production is vital to the customer and hence a significant factor, it is unrelated to shampoos' cleaning properties. It's only for a person's satisfaction.

3. Results

3.1. Physical appearance



Figure 2. Herbal Gel shampoo

Table 3. Physical Appearance Result

S. No.	Corrector Stick	Result
01	Clarity	Vary Less Clear
02	Colour	Brown
03	Odor	Pleasant
04	Texture	Smooth

3.2. Determination of pH

The gel shampoos varied from 6.1 to 6.4, which is close to the skin, and were acid balanced.

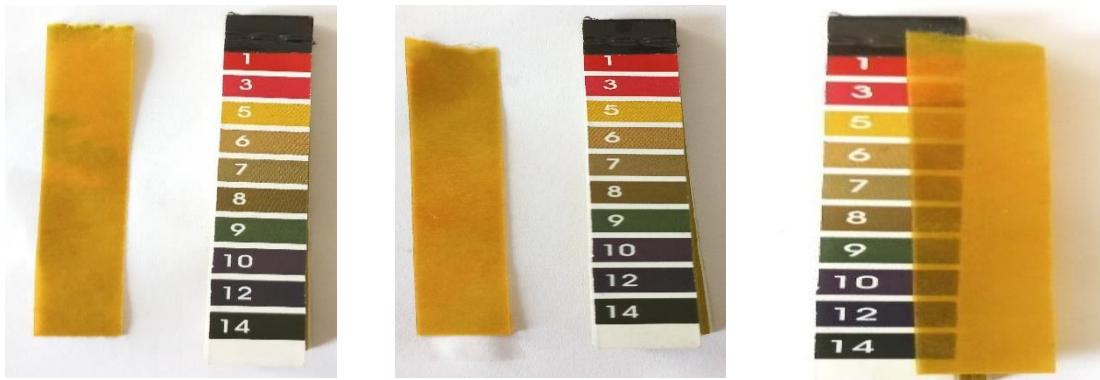


Figure 3. pH paper

Table 4. pH paper Result

S.No.	pH paper	Result
01	Sample 1	6.5
02	Sample 2	6.8
03	Sample 3	6.4

3.3. Determine percent of solids contents

Table 5. Solids Contents Result

S.No.	Sample for solids contents	Result
01	Sample 1	30.15
02	Sample 2	29.89
03	Sample 3	30.04



Figure 4. Solids contents

3.4. Dirt dispersion –

It was performed as the gel shampoo evaluating parameter.

3.5. Foam Determination

Foam was measured by Ruler.

Table 6. Foam Test Result

S.No.	Number of Test (Containing Solution in ml)	Height of Foam (cm)
01	01ml	2.67 cm
02	02ml	3.81 cm
03	03ml	3.20 cm
04	04ml	3.37 cm
05	05ml	4.07 cm

3.6. Nature of hair after washing

After washing, the hair's texture was discovered to be silky and soft.

3.7. Stability studies

Table 7. Stability Test Result

S.No.	Parameters	Observations
01	Colour	Dark Brown
02	pH	6.2
03	solids contents	33.35
04	Foam Determination	3.45 cm
05	Odor	Pleasant

4. Discussion

The majority of the content of the herbal gel shampoo is made up of herbal extracts, which have been proven to be a rich source of beneficial chemical components. Parts of plants like *Emblica officinalis*, *Acacia concinna*, *Sapindus indica*, *Hibiscus Rosa-Sinensis*, and *Eclipta prostrata*, *Aloe barbadensi*, *Azadirachta indica*, *Lawsonia inermis*, actions, including anti-dandruff, cleaning, and conditioning, had been documented. Plants were collected, and the key evaluating criteria led to good and encouraging outcomes. The results of the study showed that adding these plant extracts to gel shampoo produced a useful product with an attractive appearance and good patient compliance. Gel Shampoo has an excellent pH, which helps to regulate scalp pH and improves the hair texture. The results were good.

5. Conclusion

The current study aimed to develop a herbal gel shampoo that minimizes hair loss while combed and concurrently promotes hair growth, making it safer than chemical conditioners. Originally, herbal gel shampoo was created using

an aqueous extract of medicinal plants that are frequently used to wash hair. Synthetic conditioning chemicals are used to lessen protein or hair loss. Instead of synthetic cationic conditioners, the current study uses plant extracts like *Hibiscus Rosa-Sinensis* for Conditioning agent, *Emblica officinalis* for Anti-dandruff agent, *Acacia concinna* and *Sapindus indica* for Detergent, *Eclipta prostrata* for Hair growth, *Aloe barbadensi* for Coolant, *Azadirachta indica* for Antibacterial, anti-fungal, anti-septic, *Lawsonia inermis* for Anti-microbial, Anti-oxidant, Wound Healing, Anti-inflammatory. I complete my aim that is preparation of a good herbal gel shampoo.

Declarations

Source of Funding

This study did not receive any grant from funding agencies in the public, commercial, or not-for-profit sectors.

Competing Interests Statement

The authors declare no competing financial, professional, or personal interests.

Consent for publication

The authors declare that they consented to the publication of this study.

References

- [1] Solanki, R., Patidar, K., & Kothari, S. (2018). Polyherbal Anti-Dandruff Shampoo: Overview, Advantages, and Difficulties. *Asian Journal of Pharmaceutics*, 12(3): S849.
- [2] Abbulu, K., Sharadha, R., & Revansiddappa, M. (2018). Herbal antidandruff formulation and assessment. *Journal of Pharmacognosy and Phytochemistry*, 7(4): 764–767.
- [3] Kothiyal, P., Bhatt, M., & Purnima (2015). An overview of Nardostachys jatamansi's pharmacological and phytochemical characteristics DC-Medicinal Herb. *Journal of Pharmacognosy and Phytochemistry*, 3(5): 102–106.
- [4] Sudhir (2016). A Review of a New Ingredient in Beauty Care. *IJPSR*, 7(8): 3185–3196.
- [5] Mohamed Abbas, S., Yasser Hanafy, A., El-Saady Badawy, M., Amira Soliman, S.H., Nasir Wagini, H., & Mohamed Abbas, S. (2014). Some of Phytochemical, Pharmacological and Toxicological Properties of Henna (*Lawsonia inermis* L.): A Review of Recent Researches. The 3rd International Conference on “Sustainable Development of Natural Resources in the Nile Basin Countries.
- [6] Sharma, B., Altowairi, M., Almoiliqy, M., Alzubaidi, N., & Alhalmi, A. (2017). Xanthan Gum; its Biopharmaceutical Applications: An Overview. *World Journal of Pharmacy and Pharmaceutical Sciences*, 7(1): 1536–1548.
- [7] Al-Snaf Ali Esmail (2018). A review of *Hibiscus rosa-sinensis*'s chemical components, pharmacological activities, and medicinal significance. *Journal of Pharmacy*, 8(7): 101–11.
- [8] Patel, J., Shah, K., & Sharma, R.M. (2011). Assessment of ready-made herbal shampoo formulas and a comparative study between the developed and commercial shampoos. *International Journal of Pharmacy and Pharmaceutical Sciences*, 3(4): 402–405.

[9] Chandran, S., Vipin, K.V., Lindumol, K.V., & Shirwaikar, A. (2013). Creation and assessment of a natural source antidandruff shampoo. *J Pharm Phototherapeutics*, 1(4): 10–44.

[10] Surana, S.J., Tatiya, A.U., & Shinde, P.R. (2013). The creation and assessment of an herbal anti-dandruff shampoo formula. *International Journal of Cosmetic Science Research*, 3(2): 25–33.

[11] Vaibhav, B., Nitin, K., & Sehal, W. (2014). Original research study on the formulation and assessment of a shampoo containing polyherbal powder for dandruff. *Pharmacophore: An International Research*, 5(1): 77–84.

[12] Durravvel, P., Harish, G.B., & Potluri, A. (2013). An analysis and formulation of a herbal anti-dandruff shampoo review. *Indian Journal of Pharmacy and Biotechnology Research*, 1(6): 835–839.

[13] Basri, D.F., Santhanam, J., Nadiah, F., & Ghani, A. (2014). A study on the antifungal properties of jasminum sambac against non-malassezia and malassezia species isolated from human skin samples. *The Journal of Mycology*, 14(9).

[14] Badi, K.A., & Khan (2014). Formulation, evaluation, and comparison of the herbal shampoo with the commercial shampoos. *Journal of Basic and Applied Sciences*, Beni Suef University, 3: 301–305.

[15] Noor Husna, G.K., & Dash (2017). Formulation and evaluation of a herbal shampoo. *Indo American Journal of Pharmaceutical Sciences*, 4(09): 2860–2865.

[16] Malviya, R.D., & Sharma, P.K. (2014). Advancement in shampoo (a dermal care product): preparation methods, patents and commercial utility. *Recent Pat Inflamm Allergy Drug Discov.*, 8(1): 48–58.

[17] Dessai, P., & Phatarpekar, S. (2016). Formulation and evaluation of herbal shampoo formulations and to compare formulated shampoo with marketed shampoos. *WJ P PS*, 5(9): 1467–1477.

[18] Sharma, R.M., Shah, K., & Patel, J. (2011). Evaluation of prepared herbal shampoo formulations and to compare formulated shampoo with marketed shampoos. *International Journal of Pharmacy and Pharmaceutical Sciences*, 3(4): 402–405.

[19] Utane, R., Deo, S., & Itankar, P. (2017). Green method preparation of herbal shampoo (hs) and their depiction. *International Journal of Researches in Social Sciences and Information Studies*, 5: 254–258.

[20] Sharma, R.M., Shah, K., & Patel, J. (2011). Evaluation of prepared formulations and to compare formulated shampoo with marketed shampoos. *International Journal of Pharmaceutical Sciences and Pharmacy*, 2(4): 402–405.

[21] Shinde, P.R., Tatiya, A.U., & Surana, S.J. (2013). Design and Assessment of Herbal Antidandruff Shampoo Formulation. *International Journal of Research in Cosmetic Science*, 3(2): 25–33.

[22] Kumar, A., & Mali, R. (2007). Evaluation of prepared shampoo formulations and to compare formulated shampoo with marketed shampoos. 29(1): 14–9.

[23] Dana, R.A., Aghel, N., & Moghimipour, B. (2007). Creation of a herbal shampoo with *Acanthophyllum squarrosum*'s whole saponins, *IJPR*, 6: 167–72.

[24] Harish, G.A., Durravvel, S., Harish, A., Asma, S.S., Rallapally, N., & Potluri, A. (2013). Review of the evaluation criteria and the herbs used in anti-dandruff shampoo, *IAJPR*, 3: 3266–78.

[25] Surana, S.J., Tatiya, A.U., & Shinde, P.R. (2013). Creation and assessment of a herbal anti-dandruff shampoo formula, IJRCS, 3: 25–33.

[26] Firsthouse, P.U. (2009). Effects of Azadiracta indica and Ocimum sanctum on the composition of a herbal shampoo powder for dandruff prevention. *Der Pharm Lett.*, 1: 68–76.

[27] Maninder, K., Arun, N., & Pooja, A. (2011). An evaluation of shampoos made with synthetic components against those made with herbal ingredients. *Int J Pharm Sci Rev Res.*, 7: 41–6.

[28] Criton, S., Tarun, J., Susan, J., Suria, J., & Susan, V.J. (2014). Assessment of the pH of shampoos and bath soaps for skin and hair care. *Indian J Dermatol.*, 59: 442–4.

[29] Gaud, R.S., & Gupta, G.D. (2001). Practical Physical Pharmacy. First Ed., New Delhi: C.B.S. Publisher and Distributer, Pages 81–105.

[30] Mainkar, A.R., & Jolly, C.I. (2000). Evaluation of commercial herbal shampoos. *Int J Cosmet Sci.*, 22: 385–91.

[31] Khan, S.A., & Badi, K.A. (2014). Formulation, assessment, and contrast of the commercial and herbal shampoos. *Beni-Suef Univ J Basic Appl Sci.*, 3: 301–5.